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Prevalence and Profile of Myopia of Prematurity in A Tertiary Centre

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ABSTRACT

Objective: To find out prevalence and profile of myopia in premature babies in a tertiary centre.

Study Design: A cross sectional study was conducted in JNMCH, AMU for a period of 6 months (Oct 2019 – March 2020)

Material and methods – Cycloplegic refraction of 60 babies both premature and term was done along with studying other parameters.

Result: Prevalence of myopia in preterm was found to be 50% while in term it was 16.6%, maximum prevalence of myopia (46.1%) was found in new born weighing (1.5-2.0 kg). Also newborns who received oxygen had 51.8% prevalence of myopia.

Conclusion: In our study prevalence of myopia was found to be high in preterm newborns. Also highest prevalence of myopia was noted in lowest birth weight babies.

Key Words: Myopia of Prematurity, LBW (Low Birth Weight), Oxygen Therapy

INTRODUCTION

India has high prevalence 60% of prematurity and with that are associated ocular morbidities like myopia, retinopathy of prematurity, strabismus and cortical visual impairment. Myopia is a serious cause of reversible blindness, hence early detection and intervention will prevent amblyopia.¹ The normal refractive status of full term babies is usually hypermetropic, but in premature babies myopia is the predominant refractive error.^{2,4}

Despite a high prevalence of prematurity very sparse data is available on myopia of prematurity especially in North India. This study was conducted to find out type of refractive error in premature and term babies and to find out any correlation with factors like gestational age, birth weight, gender and oxygen intake.

Hence, we conducted this study to assess the magnitude of the problem and how early detection can prevent visual loss.

MATERIAL AND METHODS

A cross sectional study was conducted in JNMCH, AMU for a period of 6 months between (October 2019 – March

2020). A total of 60 babies both preterm and term were studied for various parameters. Babies born before 37 weeks of gestation were taken as preterm while those born after 37 weeks of gestation were labeled as term babies. Gestational age was determined from the date of last menstrual period (LMP).

All these babies underwent cycloplegic refraction using cyclopentolate drops 0.5% and phenylephrine 2.5% drops. Refraction was done within first month of life by streak retinoscope using hand held lens. Several readings were taken for each baby to counter any variability of refraction due to any residual accommodation.

Also recording of other parameters like birth weight, gender, oxygen intake and grade of myopia was done.

RESULTS

Out of 26 cases having birth rate 1.50-2.0 kg, 46.1% had myopia. On the other hand only 23% cases of myopia was seen in the birth weight ranging from 2.50 - 3.00 kg (Table 1).

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Table 1: Showing relationship of myopia with birth weight

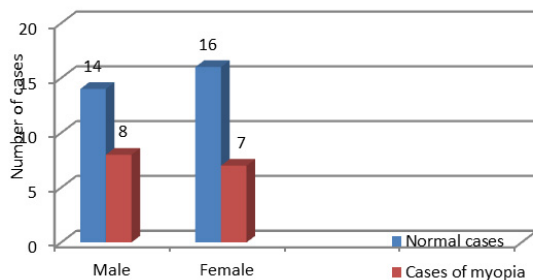
Birth Weight (kg)	Total No. of Cases	Cases with Myopia	% age of Myopia
1.50 – 2.0	26	12	46.1%
2.00 – 2.50	16	05	31.2%
2.50 – 3.00	13	03	23%
3.00 – 3.50	05	-	-

50% cases of myopia were observed in preterms (< 37 weeks). On the other hand only 16.60 % cases of myopia were observed in term babies (Table 2).

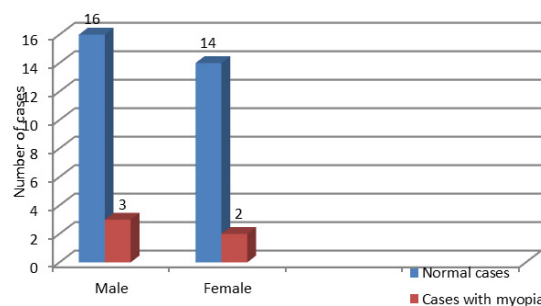
Table 2: Influence of Gestational Age on myopia

Gestational Age	Total No. of Cases	Cases with Myopia	% age of myopia
Preterm < 37 weeks	30	15	50%
Term > 37 weeks	30	05	16.6%

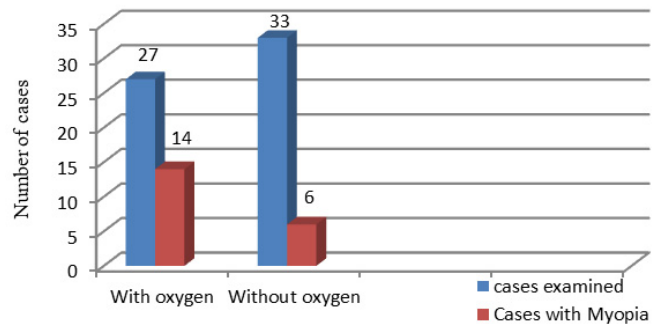
Out of 30 preterm babies 14 were males and 16 were females making the percentage of myopia as 57.0 % and 43.70 % respectively (Fig. 1).

**Figure 1: Relationship of myopia with gender among preterm babies.**

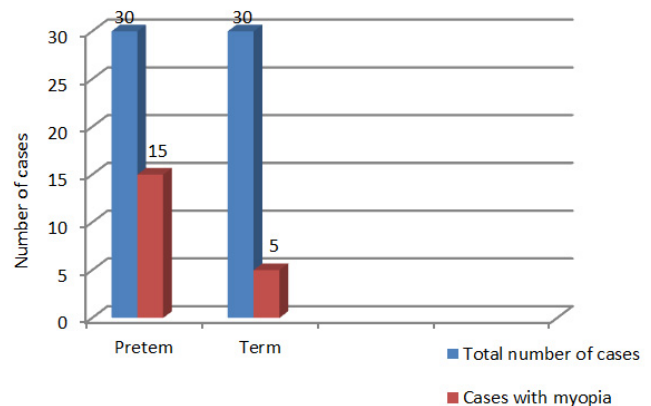
Out of 30 term babies 16 were males and 14 females and percentage of myopia was found to be 18.0 % and 14.0 % respectively (Fig. 2).

**Figure 2: Relationship of myopia with gender among term babies.**

Total cases examined with oxygen therapy were 27 and those without oxygen therapy were 33. However myopia cases with oxygen therapy were 14 (51.80 %) and without oxygen were 6 (18.18%) (Fig. 3).

**Figure 3: Relationship of myopia with oxygen therapy.**

Total number of cases of preterm babies were 30, out of which 15 showed myopia (50.0 %). While in 30 term babies studied, only 5 were found with myopia (16.60 %) (Fig. 4).

**Figure 4: Influence of gestational age on myopia.**

Total number of cases studied with birth weight 1.50- 2.00 kg were 26, out of which 12 had myopia (46.10 %). Total number of cases with birth weight 2.00- 2.50 kg were 16, out of which 5 showed myopia (31.20 %). Total number of cases with birth weight 2.50- 3.00 kg were 13, out of which only 3 showed myopia (23.0 %). While 5 cases were studied in weight group 3.00- 3.50 kg, out of which none showed myopia. (Fig. 5).

Out of total number of eyes examined in preterms 13 were in grade 1, 9 in grade 2 and 8 in grade 3, making total percentage of eyes affected as 50.0%. Out of total number of eyes studied in term babies 2 were in grade 1, 8 in grade 2 and none in grade 3, making the percentage of affected eyes as 16.60 %. (Fig. 6)

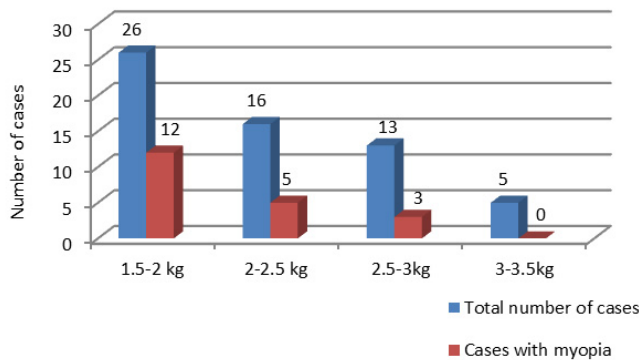


Figure 5: Relationship of myopia with birth weight.

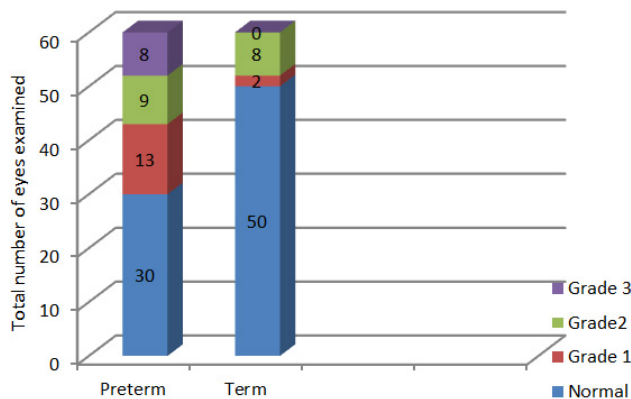


Figure 6: Severity/grading of myopia.

DISCUSSION

In our study a total of 60 patients, 30 preterm and 30 terms were studied. Prevalence of myopia was found to be 50% in preterm while 16.6% in term babies. Also percentage of myopia was found to be 50% in preterm babies by Jain & Garg.¹

Mukherji *et al*² found a prevalence of myopia of 67.5% in preterm while 11.24% in term babies which is similar to our findings. Fletcher & Brendon³ reported myopia in 100% of premature cases. This high percentage may be attributed to retinoscopy done by ophthalmoscope immediately after birth and without cycloplegic in most of the cases. Also prevalence of myopia depends upon time of examination as myopia tends to decrease with increasing age. Studies in which babies were examined within first month of life showed high percentage as compared to studies where examination was done after years.

Our research showed a high prevalence 40.47% of myopia in babies who weighed less than 2.5kg. The prevalence of myopia showed a decline with increasing birth weight. Jain & Garg¹ in their study reported myopia in 40% babies who weighed around 2.5 kg and almost nil in babies who weighed more than 3 kg which is like our results.

A similar prevalence of 48.2% was reported in babies weighing 2.5kg and occurrence of myopia showed a fall with increasing birth weight.² This observation highlights the issue that ‘premature infant’ may better be defined in terms of ‘birth weight’ rather than gestational age especially in poor countries. In a developing country preterm birth is common due to poor antenatal care and low birth weight due to fetal under nutrition.^{4,5}

A study on preterms from 2 weeks to 6 months of age from Israel reported no correlation of refractive error to gestational age or birth weight.⁶ However, some authors suggest that emmetropization with age is often not complete and the initial refractive status during critical phase of development may give rise to high prevalence of refractive errors and poor visual function in low birth weight babies.^{6,7}

Our study showed a high prevalence of myopia 51.8% in babies who received oxygen after birth as compared to ones who didn’t receive any oxygen 18.1%. Also high percentage 57.14% of myopia was reported by Jain & Garg¹ in babies who received oxygen therapy. However, some studies did not find any association of myopia with oxygen therapy.^{8,9}

Myopia of prematurity in our study did not show any strong association with any gender however male babies were affected more than female babies. Our study clearly shows association of myopic refraction with premature babies and this association shows progressive fall with increase in birth weight.

However, the exact pathogenesis of myopia in premature cases is still poorly understood. Persistence of ‘sclerectasia posterior’ after birth as the cause of myopic refraction.¹⁰ Spherical shape of lens in immature eye as the main cause.¹¹ Also increased vitreous volume has been suggested by some as the elongation force of the developing eye and subsequent myopia.¹² Exact pathogenesis of myopia of prematurity is still not well established.¹³ Our study has shortcoming in the form of small sample size. More elaborate and critical studies with long follow-ups are warranted to decipher the underlying etiology and to handle the problem in a more focused way.

CONCLUSION

Our study highlights high prevalence of myopia in preterm newborns. This is in contrast with term newborns that have hypermetropia as predominant refractive error. This study also highlights increased prevalence of myopia with decreased birth weight. High prevalence of myopia was also noted in cases who received oxygen therapy as compared to ones who didn’t receive any.

RECOMMENDATIONS

1. Careful evaluation of all premature infants is recommended to rule out any prematurity induced ocular morbidity. Every effort should be made to make these babies reach term and normal birth weight as premature babies are associated with ophthalmic complications like myopia, retinopathy of prematurity, strabismus amblyopia etc.⁹
2. Every ROP (Retinopathy of Prematurity) screening programme should include cyclorefraction to rule out myopia at an early stage.
3. Early detection and intervention will prevent irreversible ocular damage and visual loss in these children and assure better quality of life.

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Conflict of Interest: There is no conflict of interest No ethical clearance was needed as our study did not involve any human or animal experiment.

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